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This report summarizes the recommendations, implementation requirements and impact assessment for the Areawide Waste Treatment Management Plan for the Greater Houston Area. The plan was prepared by the Houston-Galveston Area Council under the provisions of Section 208 of the Federal Water Pollution Control Act Amendments of 1972 (P.L. 92-500). Regulations passed by the U.S. Environmental Protection Agency to meet the requirements of the Act specify 16 required ouputs. A summary of these requirements and the related documents prepared for the Houston Area 208 Program is presented on page 36.

In addition to the required outputs, particular emphasis has been placed on public participation. This Areawide Waste Treatment Management Plan for the Greater Houston Area - Summary report includes modifications made as a result of public input received during the review and hearing process.

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AREAWIDE WASTE TREATMENT MANAGEMENT PLAN FOR THE GREATER HOUSTON AREA

HEARING DRAFT

SUMMARY

MARCH 1978

HOUSTON-GALVESTON AREA COUNCIL

REPRODUCED BY
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SPRINGFIELD, VA. 22161

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INTRODUCTION

This report summarizes the recommendations, implementation requirements and impact assessment for the Areawide Waste Treatment Management Plan for the Greater Houston Area.

The plan was prepared by the Houston-Galveston Area Council under the provisions of Section 208 of the Federal Water Pollution Control Act Amendments of 1972 (Public Law 92-500). The U.S. Environmental Protection Agency funded development of the plan through a grant made in June, 1975. Under provisions of the grant the Houston Area plan must be completed by April 22, 1978.

Plans developed under Section 208 must address actions needed to attain clean water goals as specified by Federal law. Regulations passed by the U.S. Environmental Protection Agency to meet the requirements of the Act specify sixteen (16) required outputs (40 CFR 131.11, November 28, 1978). A summary of these requirements and the related documents prepared for the Houston Area 208 Program is presented in this report on page 36.

In addition to the required outputs particular emphasis has been placed on public participation. Section 208 plans emphasize determination of local solutions to local problems. Public input has therefore been particularly important in guiding program development.

The alternatives and proposed recommendations for meeting 208 Program requirements in the Houston Area were presented in a publication entitled, "Summary Report Areawide Waste Treatment Management Plan for the Greater Houston Area, December, 1977". Four areawide hearings were held on the proposed plan in February, 1978. The hearings resulted in a show of general support for proposed water quality management actions.

This report presents a summary of the recommendations and implementation requirements proposed to be submitted to the State and to the U.S. Environmental Protection Agency for plan certification. These recommendations include modifications made as a result of input received during the review and hearing process. A Resolution passed on February 16, 1978 by the Houston Areawide Planning Advisory Committee (see pp. 40-41) highlights the areas of revision. A final hearing is scheduled for April 12, 1978 beginning at 2:00 p.m. at the offices of the Houston-Galveston Area Council. The plan will be presented to the H-GAC Executive Committee for final, local action on April 18, 1978. The public record will be kept open until that time.

The 208 Program will be an on-going effort. Findings and recommendations will be updated as new and better information becomes available. In the meantime, the results of the initial effort will provide a basis and a system for making informed decisions concerning water quality in the Greater Houston Area.

MAJOR FINDINGS and RECOMMENDATIONS

General

- Findings/recommendations are only as good as input data and analytical tools used (e.g., population/land use projections, wasteload calculations, stream models): KEEP PROGRAM UP-TO-DATE AND RESPONSIVE TO MANAGEMENT SYSTEM AND PUBLIC PARTICIPATION. ASSIGN HIGH PRIORITY TO UPDATING POPULATION AND LAND USE ESTIMATES AND PROJECTIONS. MAINTAIN CLEAR UNDERSTANDING THAT TECHNICAL RECOMMENDATIONS ARE SUBJECT TO CHANGE AS DATA ARE REFINED AND VERIFIED.

- For the most part, operation of existing and future plants at current permit levels will result in attainment of "fishable/swimmable" water quality during dry weather conditions: ACTIVELY PROMOTE PROPER OPERATION AND MAINTENANCE OF WASTEWATER TREATMENT FACILITIES IN CONFORMANCE WITH PERMIT REQUIREMENTS.

- The preferred approach for progressing toward attainment of clean water goals builds on coordination of existing authorities, economic incentives and sharing of technical expertise: CONTINUE ACTIVE STATE ROLE IN WASTE TREATMENT MANAGEMENT AND ESTABLISH A LOCAL "WATER QUALITY COUNCIL" WITH THE RESPONSIBILITY TO (1) GUIDE IMPLEMENTATION OF 208 PROGRAM; (2) ENCOURAGE NONPOINT SOURCE POLLUTION CONTROL EFFORTS; (3) COORDINATE WATER QUALITY CONCERNS WITH OTHER PROGRAMS; (4) PROVIDE INPUT TO FEDERAL/STATE AGENCIES ON ACTIONS RELATED TO WATER QUALITY. UNTIL THE WATER QUALITY COUNCIL BECOMES OPERATIONAL, THE TEXAS DEPARTMENT OF WATER RESOURCES SHALL BE RESPONSIBLE FOR LOCAL COORDINATION WITH THE CONTINUED PARTICIPATION OF THE AREAWIDE PLANNING ADVISORY COMMITTEE.

- A limited amount of reliable data exists for substantiating the impact of pollutants coming from nonpoint sources: ASSIGN HIGH PRIORITY TO IMPROVING NONPOINT SOURCE DATA BASE, INCLUDING EFFECTIVENESS OF CONTROLS, AND ENCOURAGE LOCAL GOVERNMENT IMPLEMENTATION OF "BEST MANAGEMENT PRACTICES".

- Specific standards have not yet been formulated to gauge acceptable water quality during stormwater conditions: WORK WITH FEDERAL/STATE AGENCIES TO FORMULATE WET WEATHER WATER QUALITY STANDARDS.

- Only a limited number of water quality parameters were adequately addressed in the initial planning effort: PLAN IMPLEMENTATION SHOULD PROVIDE FOR FURTHER STUDY OF HEAVY METALS, CHLORINATED HYDROCARBONS AND OTHER TOXIC MATERIALS.

- There is technical merit in addressing water quality problems/actions on a watershed basis: ORGANIZE LOCAL 208 PROGRAM ACCORDING TO THREE PRIMARY WATERSHEDS (1) SPRING CREEK/CYPRESS CREEK/LAKE HOUSTON, (2) CLEAR CREEK/CLEAR LAKE/DICKINSON BAYOU; AND, (3) HOUSTON SHIP CHANNEL AND TRIBUTARIES. RECOMMEND TO THE TEXAS DEPARTMENT OF WATER RESOURCES THE EXPANSION OF THE DESIGNATED 208 PLANNING AREA TO COMPRISE ENTIRETY OF THE SAN JACINTO WATERSHED AND RELATED COASTAL BASINS.

- Public concern has been expressed regarding unclassified stream segments: CONTINUE TO EVALUATE THE DESIRABILITY OF CLASSIFYING OTHER AREA STREAMS AND BAYOUS.

- There is a strong desire to retain flexibility and responsiveness in implementing specific plan recommendations: WHERE SPECIFIC METHODS OF ACHIEVING STREAM STANDARDS ARE RECOMMENDED, ALTERNATE MEANS OF ACHIEVING THE DESIRED RESULTS WILL BE ACCEPTABLE.

LAKE HOUSTON SUBBASIN
(Spring Creek/Cypress Creek/Lake Houston)

- Subject to the limitations cited on the previous page, Spring Creek and Lake Houston will meet "fishable/swimmable" goal in 1995 during both dry and wet weather conditions at existing levels of treatment.

- Cypress Creek evidences a water quality problem during low flow conditions but not during wet weather: MAJOR EFFORTS SHOULD BE FOCUSED ON (1) WATER QUALITY IMPACT OF MATERIALS DEPOSITED ON STREAM BOTTOM (BENTHIC LOAD); (2) TOUGH ENFORCEMENT OF PERMIT CONDITIONS; AND, (3) CONTINUING ATTEMPTS TO IMPLEMENT JOINT TREATMENT FACILITIES SUPPORTED BY ECONOMIC INCENTIVES.

- CLOSELY MONITOR POPULATION GROWTH AND DISTRIBUTION IN THIS WATERSHED.

- RECOMMEND TO THE TEXAS DEPARTMENT OF WATER RESOURCES THE EXPANSION OF THE DESIGNATED 208 PLANNING AREA TO INCLUDE OTHER STREAMS ENTERING LAKE HOUSTON (EAST AND WEST FORKS OF SAN JACINTO RIVER, LUCE BAYOU).

CLEAR LAKE SUBBASIN
(Clear Creek/Clear Lake/Dickinson Bayou)

- Water quality problems appear to exist in this urbanized watershed during both dry and wet weather conditions.

- Clear Creek (nontidal) is unlikely to meet "fishable/swimmable" at existing, restrictive permit levels: EVALUATE FEASIBILITY OF TRANSPORTING SELECTED DISCHARGES TO HOUSTON SHIP CHANNEL VS FURTHER UPGRADING OF ALL PLANTS AND LOWERING OF DISSOLVED OXYGEN STANDARD.

- Water quality problems are evidenced during wet weather conditions in Clear Creek in 1983-1995: VALIDATE WET WEATHER MODEL AND EXAMINE EFFECTIVENESS OF NONPOINT CONTROLS IN TEST AREAS.

- Simplified stream models also indicate potential water quality problems in Armand Bayou and Dickinson Bayou (tidal) during dry weather (there are no stormwater models): VALIDATE DRY WEATHER MODELS AND INSTITUTE WET WEATHER MONITORING PROGRAM.

- RECOMMEND TO THE TEXAS DEPARTMENT OF WATER RESOURCES THE CLASSIFICATION OF ARMAND BAYOU AS A STREAM SEGMENT.

- Phosphorus (nutrient) loads to Clear Lake and Galveston Bay from nonpoint sources and tidal action most likely exceed the minimum level needed for algae problems (eutrophication): THE TEXAS DEPARTMENT OF WATER RESOURCES SHOULD IMMEDIATELY INITIATE A STUDY LEADING TO REVIEW OF PHOSPHORUS REMOVAL REQUIREMENTS FOR CLEAR LAKE, CLEAR CREEK AND DICKINSON BAYOU (TIDAL).

- Dredging operations, though infrequent, impose a substantial wasteload: PROHIBIT DREDGING OPERATIONS DURING CRITICAL DRY WEATHER CONDITIONS.

- RECOMMEND TO THE TEXAS DEPARTMENT OF WATER RESOURCES THE EXPANSION OF THE DESIGNATED 208 PLANNING AREA TO INCLUDE TEXAS CITY/GALVESTON AREA.

HOUSTON SHIP CHANNEL SUBBASIN

(Houston Ship Channel, Lower San Jacinto River and Bayou Tributaries)

- Except for the Turning Basin and points immediately downstream, water quality in the Houston Ship Channel is projected to meet "fishable/swimmable" goal during dry weather (following completion of improvements, currently underway, to City of Houston treatment system).

- Water quality in all side bays is expected to meet goal during dry weather.

- Unverified stormwater model indicates substantial water quality problems throughout the Ship Channel during wet weather conditions; dissolved oxygen drops to zero for a period of days; calculations do not correlate with recent observations (i.e., lack of fish kills): INSTITUTE A WET WEATHER MONITORING PROGRAM TO DETERMINE ACTUAL CONDITION OF CHANNEL DURING STORMS PRIOR TO RECOMMENDING FURTHER SPECIFIC ACTION ON STANDARDS, MODELS, OR CONTROLS.

- Supplemental in-stream aeration offers potential for low cost attainment of "fishable/swimmable" goal in upper reaches of Channel (dry weather): EVALUATE IN-STREAM AERATION AND MAKE DECISION REGARDING COMPLETE IMPLEMENTATION FOLLOWING RESULTS OF WET WEATHER STUDIES.

- Quality of the Lower San Jacinto River (tidal) dominated by the Houston Ship Channel and impacted by dredging activities: PROHIBIT DREDGING IN LOWER SAN JACINTO RIVER DURING CRITICAL DRY WEATHER CONDITIONS.

- CLASSIFY BUFFALO BAYOU FOR NON-CONTACT RECREATION USE BETWEEN TURNING BASIN AND ADDICKS/BARKER DAMS. LAUNCH PROGRAM TO DETERMINE DRY/WET WEATHER QUALITY AND STANDARDS TO MEET INTENDED USE, INCLUDING PRESERVATION OF BAYOU AESTHETICS.

- FOR ALL OTHER BAYOUS, CONCENTRATE EFFORTS ON PERMIT COMPLIANCE AND KEEPING BACTERIAL COUNTS AT SAFE LEVELS.

- RECOMMEND TO THE TEXAS DEPARTMENT OF WATER RESOURCES THE EXPANSION OF THE 208 PLANNING AREA TO INCLUDE CEDAR BAYOU WATERSHED. (Coordinate this recommendation with the Trinity River Authority).

TECHNICAL BACKGROUND

The development of specific technical subplans was organized into three major subbasins according to watershed boundaries. These subbasins and the stream segments included in each are as follows. (Further details including alternatives considered may be found in the publication "Summary Report of Alternatives/ Recommendations December, 1977". Appropriate page references are shown in parentheses below).

Lake Houston Subbasin: (pp. 18 to 24)	Spring Creek, Segment 1008 Cypress Creek, Segment 1009 Lake Houston, Segment 1002
Clear Lake Subbasin: (pp. 19 to 39)	Clear Creek Nontidal, Segment 1102 Clear Creek Tidal, Segment 1101 Clear Lake, Segment 2425 Armand Bayou, Unclassified* Dickinson Bayou Nontidal, Segment 1104 Dickinson Bayou Tidal, Segment 1103
Houston Ship Channel Subbasin: (pp. 40 to 47)	San Jacinto River, Segment 1001 Turning Basin, Segment 1007 Turning Basin to San Jacinto River, Segment 1006 San Jacinto River to Morgans Point, Segment 1005 Buffalo Bayou, Unclassified* Tabbs Bay, Segment 2426 San Jacinto Bay, Segment 2427 Black Duck Bay, Segment 2428 Scott Bay, Segment 2429 Burnett Bay, Segment 2430

*Unclassified segments have not received detailed study by TDWR and therefore have no assigned segment number.

Recommendations for point sources are based on permit restrictions required to meet water quality standards. Permit requirements presently in use by the Texas Department of Water Resources for various levels of restriction (effluent sets) are shown in the following table.

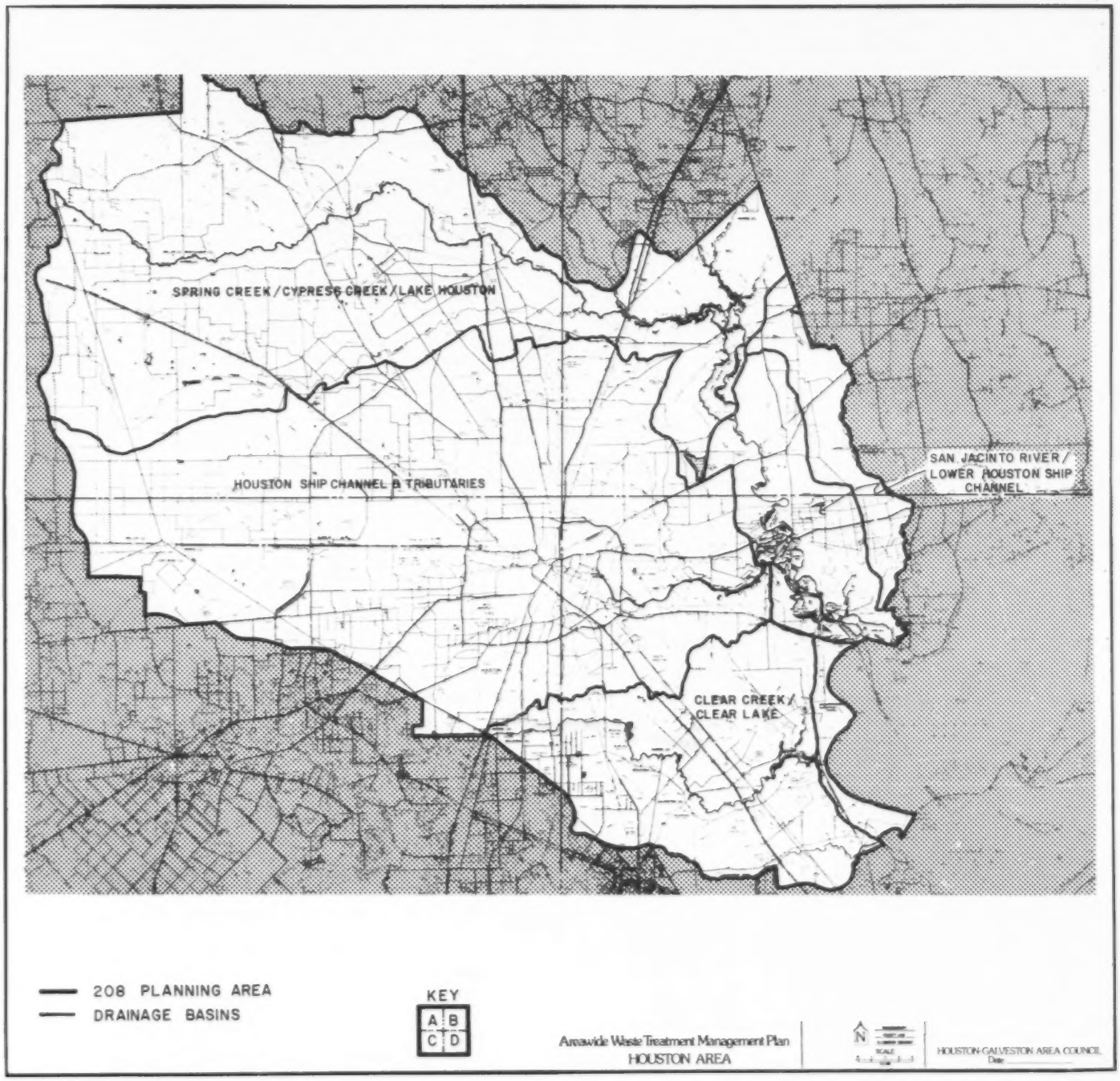
TDWR EFFLUENT SETS

Effluent Set	Level of Treatment				Treatment Process Corresponding to Effluent Set
	BOD	TSS	NH_3-N	P*	
0	30	30	-	-	Oxidation Ponds
1	20	20	-	-	Secondary (conventional design)
2	10	15	-	-	Modified secondary (enhanced solids separation)
3	5	10	-	-	Set 2 with chemical addition
4	5	5	-	-	Set 3 with filters
2N	10	15	5	-	Set 2 with biological nitrification
3N	5	10	5	-	Set 3 with biological nitrification
4N	5	5	3	-	Set 4 with biological nitrification
3P	5	10	-	2	Chemical addition in biological process
4P	5	5	-	1	Chemical precipitation after biological process

"NH_3-N" stands for ammonia-nitrogen which imposes an oxygen demand.

"P" stands for Phosphorous which is a nutrient.

208 PLANNING AREA



TECHNICAL RECOMMENDATIONS

The technical recommendations which follow are based on the best information available at the time of plan preparation. Specific segment recommendations are heavily dependent on input data such as population/land use, wasteload calculations, stream models, effluent criteria and instream water quality standards.

TECHNICAL RECOMMENDATIONS ARE SUBJECT TO CHANGE AS DATA ARE REFINED AND VERIFIED

It should also be understood that where specific methods of achieving stream standards are recommended, alternative methods of achieving the desired results will be acceptable.

AREAWIDE RECOMMENDATIONS

Certain recommendations apply to the total area and are common to all subbasins and stream segments. These will not be repeated with the specific segment recommendations. General areawide recommendations are as follows:

- High priority should be assigned to updating population and land use estimates and projections.
- Plan implementation should provide for further study of heavy metals, chlorinated hydrocarbons and other toxic materials.
- Continue to evaluate the desirability of classifying other area streams and bayous.

Dry Weather Conditions:

- Recommend that TDWR conduct studies leading to possible adoption of an effluent standard of 8 mg/l of ammonia nitrogen (NH_3-N) for use in permits where more restrictive levels do not presently apply.
- Maximum limits on chlorine residual in plant effluents should be considered by TDWR.
- Operate existing and future industrial wastewater treatment facilities at federally-mandated standards.

Wet Weather Conditions:

- Recommend to EPA and TDWR that wet weather standards be formulated consistent with "fishable/swimmable" goal.
- High priority should be assigned to improving nonpoint source data base including effectiveness of controls.
- Use of Best Management Practices should be encouraged to reduce amount of pollutants washed to streams.

LAKE HOUSTON SUBBASIN

The Lake Houston Subbasin is located in the northern third of the 208 planning area. Much of Houston's rapid growth is taking place in this area. The major waterways within this subbasin are Spring Creek and Cypress Creek, which combine and flow to Lake Houston. The lake serves as a major water supply and recreation area.

SPRING CREEK (Segment 1008)

Headwaters in northeast Waller County, flows eastward to its confluence with the West Fork of the San Jacinto River and Lake Houston (68 miles). Major tributaries include Willow Creek, Panther Branch, Mill Creek, Walnut Creek, Cypress Creek. Historically rural and agricultural; rapidly developing urban/suburban area with major growth at Woodlands, near City of Magnolia and along Creek.

Current municipal permits are 10 mg/1 BOD, 15 mg/1 TSS monthly average. (effluent set 2). The Woodlands plant is permitted at 5 mg/1 BOD, 5 mg/1 TSS, 2 mg/1 P monthly average (modified effluent set 4 P).

For more information see pp 20-21, Summary Report, December, 1977.

Recommendations:

Dry Weather
- Operate existing and future wastewater treatment facilities at existing permit levels.
- Keep alert to regional wastewater treatment opportunities if warranted by future population patterns.
- Implement monitoring program to update and verify dry weather model.

Wet Weather
- Implement monitoring program to update and verify wet weather model.

CYPRESS CREEK (Segment 1009)

Major tributary of Spring Creek and Lake Houston. Originating in Waller County flowing easterly (58 miles) to its confluence with Spring Creek, 6 miles upstream of Lake Houston. Major tributaries include Little Cypress Creek, Mound Creek, and Snake Creek. Historically rural, rapidly developing suburban-residential area with major growth along the Creek from FM 290 eastward.

Current municipal permits are 10 mg/1 BOD, 15 mg/1 TSS, 5 mg/1 NH_3-N as monthly averages (effluent set 2N).

For more information see pp 22-23, Summary Report, December, 1977.

Recommendations:

Dry Weather
- Operate existing and future wastewater treatment facilities at current permit levels pending outcome of benthal load studies.
- Initiate field studies to assess (1) actual benthal demand along the Creek, (2) relationship between level of sewage treatment and benthal load, and (3) verify steady state model.

- Implement strong enforcement policy to ensure permit compliance.
- Future treatment facilities should have the flexibility to meet effluent requirements as stringent as 4N with post aeration.
- Actively pursue opportunities for regional wastewater treatment.

Wet Weather
- Implement monitoring program to update and verify wet weather model.
- Closely coordinate with flood control projects, particularly as related to water quality impacts and implementation of nonstructural controls.

LAKE HOUSTON (Segment 1002)

Located 15 to 20 miles northeast of Houston; serves as a potable water supply reservoir. Also provides water for industrial use, mining, irrigation, and recreational purposes. Major tributaries include East and West Forks of San Jacinto River, Spring Creek, Caney Creek, Peach Creek, Luce Bayou, Tarkington Bayou. Suburban development around the Lake, historically not extensive. Increasing rapidly, however, with the growth of Houston area.

Current municipal permits (within five miles of the Lake) are 10 mg/1 BOD, 15 mg/1 TSS, and 5 mg/1 NH_3-N (effluent set 2N). The Kingwood (Harris County Utility District 5) plants are permitted at 5 mg/1 BOD, 10 mg/1 TSS, and 5 mg/1 NH_3-N (effluent set 3N).

For more information see pp 24-25, Summary Report, December, 1977.

Recommendations:

Dry Weather
- Operate existing and future municipal wastewater treatment facilities at current permit levels.
- Keep alert to regional wastewater treatment opportunities if warranted by changing population patterns.
- Closely monitor population growth and update projections for the area.

Wet Weather
- Encourage best management practices to reduce amount of pollutants to Lake.
- Implement eutrophication study to encompass entire Lake Houston watershed.

SEGMENT CLASSIFICATIONS:

All segments in this subbasin are classified by the State of Texas Water Quality Management Program, FY 1978 as Water Quality Limited. This means that the State has determined that a reasonable doubt exists regarding attainment of 1983 goals and/or water quality standards.

CLEAR LAKE SUBBASIN

The Clear Lake Subbasin is located in the southern third of the 208 planning area, southeast of Houston. This area has experienced major development in the past five years and is projected to continue this trend throughout the planning period. It is an area particularly affected by land subsidence. The major waterways studied are Clear Creek and Armand Bayou, which drain into Clear Lake (a center of water-related recreational activity), Clear Lake, itself, and Dickinson Bayou, which drains into Dickinson Bay and Galveston Bay.

CLEAR CREEK NONTIDAL (Segment 1102)

Headwaters in eastern Ft. Bend County, flows 31 miles to the tidal headwaters at FM 528 in Galveston County; forms the boundary between Harris and Brazoria Counties. Major tributaries include Cowart Creek, Turkey Creek, Mary's Creek, Mud Gully, Hickory Slough. Historically rural; experiencing suburban/residential development which is projected to continue in the future.

Current municipal permits are 5 mg/1 BOD, 12 mg/1 TSS, 5 mg/1 NH_3-N, 2 mg/1 P as monthly averages (modified effluent set 3NP).

For more information see pp 28-29, Summary Report, December, 1977.

Recommendations:

Dry Weather
- The TDWR should immediately initiate a study leading to review of phosphorous removal requirements.
- Institute a monitoring program to update and verify dry weather model.
- Implement a strong enforcement policy to ensure permit compliance.
- Evaluate interbasin transport of major municipal wasteloads (at effluent set 2) to Houston Ship Channel watershed in order to achieve economic advantages and fishable/swimmable quality.
- If interbasin transport not feasible and pending outcome of model verification, upgrade and operate treatment facilities at a level as restrictive as effluent set 4 NA and lower dissolved oxygen standard to 4.5 mg/1.

Wet Weather
- Calibrate and verify wet weather model inputs and response.
- Select and develop test areas to monitor the effectiveness of nonstructural controls.
- If verified models confirm potential water quality problems:
  (1) Expand test area program.
  (2) Reserve sufficient land to implement nonstructural controls.
  (3) Based on test area results, implement most satisfactory nonstructural controls.
- Closely coordinate with flood control projects, particularly as related to water quality impacts and implementation of nonstructural controls.

CLEAR CREEK TIDAL (Segment 1101)

Includes 12 miles from the upper end of Clear Lake to normal tidewater head at FM 528 in Galveston County. Major tributaries include Robinson Bayou, Cow Bayou, Magnolia Creek, Chigger Creek. Historically rural/agricultural (pastureland), oil fields; suburban/residential and commercial development predicted to increase in the future.

Current municipal permits are 5 mg/1 BOD, 12 mg/1 TSS, 5 mg/1 NH_3-N, 2 mg/1 P as monthly averages (modified effluent set 3NP).

For more information see pp 30-31, Summary Report, December, 1977.

Recommendations:

Dry Weather
- The TDWR should immediately initiate a study leading to review of phosphorous removal requirements.
- Operate municipal wastewater treatment facilities at existing permit levels.
- Dredging activities should be prohibited during critical dry weather conditions.

Wet Weather
- Evaluate problems and potential solutions in conjunction with recommendations for nontidal portion.

CLEAR LAKE (Segment 2425)

Located 23 miles southeast of downtown Houston between Harris and Galveston Counties. Major tributaries include Clear Creek, Armand Bayou, Taylor Bayou, Jarbo Bayou. Serves as a contact recreation facility. Surrounded by high degree of urban/suburban development.

Current municipal permits are 5 mg/1 BOD, 12 mg/1 TSS, 5 mg/1 NH_3-N, 2 mg/1 P as monthly averages (modified effluent set 3 NP).

For more information see pp 32-33, Summary Report, December, 1977.

Recommendations:

Dry Weather
- The TDWR should immediately initiate a study leading to review of phosphorous removal requirements.
- Operate municipal wastewater treatment facilities at existing permit levels.
- Prohibit dredging operations during critical dry weather conditions.

Wet Weather
- Initiate wet weather water quality monitoring program to determine if any similarities exist with predicted quality in the Clear Creek Nontidal segment.

ARMAND BAYOU

Major tributary of Clear Lake, tidally influenced and located 10 miles southeast of downtown Houston. Suburban/residential development; highly utilized nature study area.

Current municipal permits are 5 mg/1 BOD, 12 mg/1 TSS, 5 mg/1 NH_3-N, 2 mg/1 P as monthly averages (modified effluent set 3 NP).

For more information see pp 34-35, Summary Report, December, 1977.

Recommendations:

Dry Weather
- Classify Armand Bayou as a stream segment and determine desired water quality standards.
- Institute a water quality monitoring program to develop a calibrated/verified model.
- The TDWR should immediately initiate a study leading to review of phosphorous removal requirements.
- Operate municipal wastewater treatment facilities at existing permit levels.

Wet Weather
- Institute a wet weather water quality monitoring program to determine if water quality problems exist similar to Clear Creek nontidal.

DICKINSON BAYOU NONTIDAL (Segment 1104)

Headwaters in eastern Brazoria County, extends 9.5 miles downstream to tidal headwater at river mile 13.5. Historically rural and agricultural (cattle, rice); scattered producing oil and gas wells; development primarily suburban/residential.

Current municipal permits are 20 mg/1 BOD, 20 mg/1 TSS as monthly averages (effluent set 1).

For more information see pp 36-37, Summary Report, December, 1977.

Recommendations:

Dry Weather
- Operate existing municipal wastewater treatment facilities at current permit level (effluent set 1).
- Extend verified model recommended for tidal segment to include nontidal segment.
- Increased wasteloads may require upgrading level of treatment prior to 1995.

Wet Weather
- Institute a wet weather water quality monitoring program.

DICKINSON BAYOU TIDAL (Segment 1103)

Upper reach of this segment is river mile 13.5 near Cemetery Road; enters Galveston Bay through Dickinson Bayou; comprises urbanized portion of the Dickinson Bayou watershed. Major tributaries include Green Bayou, Benson Bayou, Magnolia Bayou (Geissler Gully), Borden's Gully. Historically rural and agricultural (cattle, rice); urban development centered around City of Dickinson with associated suburban/residential development.

Current municipal permits are 10 mg/1 BOD, 15 mg/1 TSS, 2 mg/1 P as monthly averages (effluent set 2P).

For information see pp 38-39, Summary Report, December, 1977.

Recommendations:

Dry Weather
- The TDWR should immediately initiate a study leading to review of phosphorous removal requirements.
- Operate existing municipal wastewater treatment facilities at existing permit levels.
- Develop a dry weather model to determine possible need for upgrading municipal wastewater treatment facilities.

Wet Weather
- Institute a wet weather water quality monitoring program.

SEGMENT CLASSIFICATIONS:

Segments as classified in State of Texas Water Quality Management Program, FY 1978:

Clear Creek Nontidal - water quality limited
Clear Creek Tidal - water quality limited
Clear Lake - effluent limited
Dickinson Bayou Nontidal - water quality limited
Dickinson Bayou Tidal - water quality limited

Water quality limited means that the State has determined that a reasonable doubt exists regarding attainment of 1983 goals and/or water quality standards.

Effluent limited means that the State has determined that barring unforeseen circumstances the 1983 goals will be attained on these surface waters utilizing secondary treatment.

HOUSTON SHIP CHANNEL SUBBASIN

This subbasin is located in the central portion of the 208 planning area. The major waterways are the Houston Ship Channel (HSC) and Lower San Jacinto River. Aside from being the major transport vehicle for large quantities of wastes from the Houston urban-industrial complex, the Houston Ship Channel is a major navigation artery linking the Port of Houston with Galveston Bay and the Gulf of Mexico.

The HSC receives significant contributions of municipal and industrial waste-loads via numerous tributaries including Buffalo Bayou, White Oak Bayou, Brays Bayou, Sims Bayou, Hunting Bayou, Vince Bayou, Greens/Halls Bayou, and Carpenter Bayou.

At the lower end of the HSC are located several large side bays which provide a source of recreational activity and serve as nursery grounds for several commercially important marine species (e.g., shrimp). The area surrounding these bays includes undeveloped land (where local wildlife can be observed) as well as residential and industrial development.

HOUSTON SHIP CHANNEL

This watershed includes each of the following segments:

Houston Ship Channel Proper	Side Bays
Segment 1005-Morgans Point to San Jacinto River	Segment 2426-Tabbs
Segment 1006-San Jacinto River to Turning Basin	Segment 2427-San Jacinto
Segment 1007-Turning Basin	Segment 2428-Black Duck
	Segment 2429-Scott
	Segment 2430-Burnett

Major tributaries include Lower San Jacinto River, Carpenters Bayou, Greens/Halls Bayou, Hunting Bayou, Vince Bayou, Sims Bayou, Brays Bayou, Buffalo Bayou, White Oak Bayou. The watershed is a highly urbanized and industrial area; extensive amount of shipping activity; side bays offer recreational activities.

Current municipal permits are 10 mg/1 BOD, 15 mg/1 TSS (effluent set 2) except for the City of Houston 69th Street/North Side and Sims Bayou plants, which are permitted at 10 mg/1 BOD, 15 mg/1 TSS, and 5 mg/1 NH_3-N (effluent set 2N).

For more information see pp 42-43, Summary Report, December, 1977.

Recommendations:

Dry Weather
- No new point source controls until it is determined if fishable/swimmable is attainable.
- Verify dry weather model with emphasis on nitrogenous and benthal oxygen demands.
- Expand dry weather model to include all tributaries receiving major waste-loads.
- Actively evaluate instream aeration to obtain additional stream assimilative capacity if fishable/swimmable standards are to be met.

Wet Weather
- Institute a wet weather water quality monitoring program.

- If monitoring indicates fishable/swimmable is attainable, develop a verified model for both inputs and response.
- If monitoring indicates fishable/swimmable is unattainable, existing standards should not be changed.

SAN JACINTO RIVER TIDAL (Segment 1001)

Extends from 200 yards below IH-10 upstream 20 miles to Lake Houston Dam. Major tributaries include Jackson Bayou, Granite Spring Creek. Used extensively for contact recreation; some industrial development in lower portion with several residential developments along the Segment.

Current municipal permits are 20 mg/1 BOD, 20 mg/1 TSS as monthly averages (effluent set 1).

For more information see pp 44-45, Summary Report, December, 1977.

Recommendations:

Dry Weather
- Operate municipal wastewater treatment facilities at existing permit levels.
- Update dry weather model with emphasis on benthal load.
- Prohibit dredging during critical dry weather conditions.
- Monitor water quality to measure impact of Houston Ship Channel.

Wet Weather
- Institute wet weather water quality monitoring program, including measuring the impact of the Houston Ship Channel on the lower portion of this Segment.

BUFFALO BAYOU

Unclassified stream with headwaters near the City of Katy. Major channel originates below Addicks and Barker Dams and flows easterly some fifty river miles to its entry into the Houston Ship Channel. Much of the area adjacent to the stream has remained in a natural state and is considered a scenic and recreational attraction of the City. The bayou is a focal point of the City's park system with a landscaped parkway along its banks through the center of town. Residential areas are also centered around the bayou's natural setting. Buffalo Bayou is a major transport vehicle of urban runoff. Rapid growth is taking place in the western portions of this watershed.

Recommendations:

Dry Weather
- Classify that section of the bayou between the Turning Basin and Addicks/Barker Dams.
- Determine desired water quality for classfied segment consistent with non-contact recreation and preservation of bayou aesthetics.
- Extend Houston Ship Channel model to include Buffalo Bayou up to Barker Dam and determine wasteload allocations consistent with water quality standards.

Wet Weather
- Monitor wet weather water quality.
- Utilize modeling efforts currently underway under the direction of the

City of Houston Health Department and Rice University.
- Closely coordinate all efforts with flood control projects, particularly as related to water quality impacts and implementation of nonstructural controls.

OTHER TRIBUTARIES OF THE HOUSTON SHIP CHANNEL

Included are Brays Bayou, Sims Bayou, White Oak Bayou, Hunting Bayou, Vince Bayou, Greens/Halls Bayou, and Carpenter Bayou. All but the upper reaches of the Greens/Halls and Carpenter Bayous flow through the heavily urbanized Houston metropolitan area. Dry weather flows in these tributaries consist largely of sewage treatment plant effluent. Recreational uses consist of hike and bike trails along these watercourses.

Recommendations:

- Do not classify at this time; continue to evaluate desirability of classification during plan update.
- Attempt to meet fecal coliform concentrations of less than 200 MPN/100 ml.
- Operate existing and future municipal wastewater treatment facilities at current permit levels.
- Operate existing and future industrial wastewater treatment facilities at Federally-mandated standards.

SEGMENT CLASSIFICATIONS:

Segments as classified in State of Texas Water Quality Management Program, FY 1978:

Houston Ship Channel	- water quality limited
Tabbs Bay	- water quality limited
San Jacinto Bay	- water quality limited
Black Duck Bay	- effluent limited
Scott Bay	- water quality limited
Burnett Bay	- water quality limited

For definitions of water quality and effluent limited classifications see page 13.

MANAGEMENT RECOMMENDATIONS

One of the unique aspects of Section 208 provisions is the requirement that the plan specifically identify those agencies to be responsible for plan implementation. This requirement is perhaps the MOST IMPORTANT ASPECT of the 208 effort. It is this management feature that distinguishes the 208 Program from past water quality planning efforts.

The functions to be performed by the management system were organized into five major groups.

- REGULATORY AND COMPLIANCE FUNCTIONS

  Standard Setting - establishment of measures of stream quality and effluent quality consistent with desired uses and EPA regulations.

  Permitting - the issuance of discharge permits (presently point source only) to conform to water quality standards.

  Monitoring - analysis of the quality of discharged effluent and stream water for compliance with standards and permits.

  Enforcement -administrative and/or legal action to assure compliance with regulations.

  RECOMMENDATION: TEXAS DEPARTMENT OF WATER RESOURCES

- WATER QUALITY PLANNING FUNCTION

  Update 208 Plan for Annual Certification. Short and long-range comprehensive water quality planning, including relationship to other physical planning programs (for example, parks and recreation, transportation, housing, etc.).

  RECOMMENDATION: HOUSTON-GALVESTON AREA COUNCIL

- WASTEWATER TREATMENT FUNCTIONS

  The functions in this group are directly related to construction and operation of waste treatment facilities including development of detailed facilities plans and raising revenues for capital costs and operations. The activities performed in this functional group are intensive and highly localized. These include Design and Construction, Operation and Maintenance, and Finance.

  RECOMMENDATION: PRESENT SYSTEM COORDINATED

  Present System Operators: Cities, Water Districts, San Jacinto River Authority, Gulf Coast Waste Disposal Authority and private operators.
  Coordination: Water Quality Council (see p.19).

- NONPOINT SOURCE CONTROL

The establishment and implementation of programs to control pollution from nonpoint sources.

RECOMMENDATION: MAKE FULL USE OF EXISTING AUTHORITIES AND ASSIGN HIGH PRIORITY TO PROGRAM

Program activities to include:

(1) TEXAS DEPARTMENT OF WATER RESOURCES

- Establish wet weather water quality standards
- Verify and calibrate nonsteady state models
- Sampling and special studies in areas of particular concern

(2) LOCAL GOVERNMENT

- Encourage enforcement of existing ordinances such as erosion control, anti-litter, leash laws and building permits
- Consider use of subdivision plat approval and regulations to include nonpoint source control provisions
- Proper maintenance of sewer lines, storm sewers, drains and drainage ditches
- Encourage acquisition of linear greenbelt buffer zones

(3) WATER QUALITY COUNCIL

- Provide assistance to communities in developing nonpoint sources control programs
- Share technical expertise and experience
- Encourage special studies to verify region specific problems
- Guide progress toward goal achievement

- MANAGEMENT/COORDINATION

This function focuses on implementation of water quality programs at the local level. It formalizes working relationships between operators, regulatory agencies, and interest groups and affixes primary responsibility for progress toward 208 goals. Activities will include regional water quality policy setting, recommendation of action priorities, sharing of technical expertise, guide implementation of nonpoint programs, and provide local input to Federal and State programs.

RECOMMENDATION: CREATE WATER QUALITY COUNCIL

For revisions see chpt. 7 Implementation Requirements Report.

WATER QUALITY COUNCIL

Concept: To establish a coordinating body of governmental systems managers/operators responsible for the operation and management of point and nonpoint source water quality programs.

Purpose: The Greater Houston Water Quality Council will be a forum for intensive consultation and coordination on the operation of systems and programs so as to enable meeting the standards and criteria established in the planning process and promulgated in Federal, State and local policy.

Authority: The Council's authority shall derive only from the authority of its constituent members. The Council is not vested with independent authority as a free-standing agency. The sharing of individual authorities toward the common purpose of the Council will be by inter-agency agreement as enabled through the Interlocal Cooperation Act.

Functions And Responsibilities

- Guide the implementation of the areawide water quality plan (208)
- Comment, review on update to the areawide plan.
- Input to update of goals and objectives for both point and nonpoint systems.
- Furnish input to the construction grants priority list for the area.
- Furnish input to the A-95 review.
- Review/comment on discharge permit applications.
- Furnish input to water quality standards and wasteload allocations.
- Encourage or initiate special studies, e.g., benthal loads, stormwater, stream aeration.
- Guide and/or initiate nonpoint source program development.
- Render assistance to communities, developers, districts, and systems operators.
- Assume responsibility for public participation/information in water quality matters.
- Coordinate water quality concerns with other programs (flood prevention, water supply, solid waste planning, parks and recreation other elements of comprehensive planning).
- Furnish assistance in determining financing mechanisms
- Furnish input to proposed legislation
- Recommend/comment on enforcement actions
- Assist in watershed coordination (see p. 22)

Composition: Initial Task Force recommendations; subject to change during the continuing planning process.

The Council will have eight (8) members representing each of the following:

City of Houston
Gulf Coast Waste Disposal Authority
San Jacinto River Authority
Harris County
Other Counties in the 208 area
Other Cities in the area
Water Districts
Soil and Water Conservation Districts

The composition of the Council as described represents the designated 208 planning area as presently defined. If the planning area is expanded to comprise the entirety of the San Jacinto watershed and related coastal basins (as recommended to the Texas Department of Water Resources) the composition of the Council will be reevaluated.

In addition there will be a resource panel to consist of named organizations from both the public and private sector, as invited by the Water Quality Council when created. Organizations which desire a representative on the Resource Panel should so indicate to the Council when established. Additionally, a Citizens Advisory Group should be established for the hearing of all interested points of view and viewpoint representatives. Membership in the Citizens Advisory Group should be open-ended.

Methods of Appointment

The representatives to the Council should be elected or appointed representatives of sufficient stature to be able to speak authoritatively for the government represented.

A Senior level representative will be named by each of the following entities:

City of Houston
Gulf Coast Waste Disposal Authority
San Jacinto River Authority
Harris County

For the other Council members a representative will be selected through the following recommended procedures:

Other Counties - Five Counties other than Harris County are involved in the current 208 area. A voting representative for these five counties should be requested from the County Judges and Commissioners Association. A caucus meeting to accomplish this nomination is the action of choice.

Soil & Water Conservation Districts - A caucus of affected soil and water conservation districts in the 208 area is suggested. A similar process chooses their appointee to the H-GAC Executive Committee.

Other Cities - A caucus of cities of the 208 area convened by the second largest city (Pasadena) is the suggested method for securing an appointee. This procedure was followed in the case of a board member for the Transit Authority.

Water Districts - The responsibility for naming a representative of water districts should be vested in the respective watershed coordinator for each of the three areas involved in the 208 region. The three water district representatives thus named should serve as the water district representative for a one year term on a rotating basis. The other two representative not so serving should serve ex officio on the resource panel.

Procedures

The Water Quality Council should establish its own procedures and methods

of operation. It is essential however, that it operate as an agency subject to the Texas Open Meetings Law - all of its procedures being completely open. This would represent a continuation of the open public participation process used in the 208 planning program.

Staff

A requirement may exist for limited staff devoted to fulfilling the Council's stated functions and responsibilities.

Initial staffing and office space can be provided through the H-GAC pending the availability of federal funding assistance and/or fund commitments by participating entities. An alternative to maintaining a separate staff for the Water Quality Council would be to assign the functions to existing professional personnel of the member entities. This will be determined during the establishment period.

Establishment

The Water Quality Council will be formed when the 208 plan has received approval by the Governor, State of Texas, and the Environmental Protection Agency. Final details of the Water Quality Council, including interagency agreements and operating procedures, will be a major activity of the work plan for the first annual 208 update.

A resolution forming a Water Quality Council Task Force was adopted by the Areawide Planning Advisory Committee on February 16, 1978. The Task Force has as its responsibility the development of an acceptable joint cooperative agreement for creation of the Council.

Interim Actions

In the period of time between the completion of this plan and the creation of the Council, the Texas Department of Water Resources will have the responsibility for Management/Coordination. It is recommended that the Areawide Planning Advisory Committee continue to provide guidance and local input in accordance with its original charter. Creation and initial operations of the Water Quality Council will be handled through the continuing planning process under the direction of the Houston-Galveston Area Council.

WATERSHED COORDINATION

A key to long-term implementation within the framework of the Water Quality Council is the role to be played by the "Watershed Coordinator". Agencies so designated would assume primary responsibility for overseeing what takes place in a given watershed.

The merits of addressing water quality problems on a watershed basis have been demonstrated in the presentation of Technical Subplans.

At the present time, it is envisioned that the major operators (City of Houston, Gulf Coast Waste Disposal Authority, and San Jacinto River Authority) would assume watershed coordination roles. Assignment of specific geographic responsibilities will be agreed upon by the participating entities.

An agency slated to become a Watershed Coordinator will agree to fulfill related responsibilities. These agreements shall in no way contravene any other management authorities existing in the watershed.

A chief responsibility of each Watershed Coordinator will be to work with municipalities and water districts in preparing applications for Federal funds to aid construction of wastewater treatment facilities (201 Construction Grants Program). The Coordinator will assist in assessing incentives for developing joint waste treatment facilities among neighboring communities. The 208 Plan will be a principal reference in making such evaluations. The evaluations shall take place prior to clearinghouse (A-95) review by the H-GAC. A project which conforms with 208 Program recommendations should receive a priority advantage in the State's listing of projects eligible for Federal assistance.

The Watershed Coordinator will also serve as a " first stop" for engineers and developers seeking information for project work in a given watershed. This will provide a degree of organization that is presently lacking.

By this concept, the coordinating agencies would also be likely recipients of Federal/State grants for performing special studies called for in the 208 Program. Such arrangements would also be subject to interagency agreement and Water Quality Council review.

A final and most important function of each Coordinator would be to lead the way in developing corrective, nonpoint source programs in its area of authority and coordination responsibility. This would include (1) providing technical assistance, (2) performing special studies, and (3) implementing exemplary programs.

IMPLEMENTATION REQUIREMENTS

One of the unique features of Section 208 requirements is that the plan be implemented. The initial 208 planning effort will present in preliminary form the major actions which must be taken by the designated management agencies in order to bring about implementation of the recommended technical and management plans.

As mentioned previously, the Water Quality Council will have as a primary function the responsibility to guide the implementation of the 208 plan and to provide review/comment on the future updates. Until the Council becomes operational, the Houston Areawide Planning Advisory Committee will continue to provide guidance at the local level and the Texas Department of Water Resources (TDWR) will retain responsibility for coordination of water quality actions.

Establishment of the WQC is a vital link to local implementation of the 208 plan. Until it is operational, detailed action steps cannot be considered finalized as it is important for the Council to review and affirm proposed implementation actions. Presented below are highlights of this activity organized by functional management group.

- REGULATORY AND COMPLIANCE

  Identification of possible new permit variables.
  - Maximum limit on chlorine residuals.
  - Maximum limits on ammonia-nitrogen for all effluent set 2 plants.
  - Minimum dissolved oxygen levels (as monthly average)

  Identification of monitoring requirements.
  - See special studies, page 26.
  - Coordinate data collection of local agencies.

  Input to Texas Department of Water Resources on standards.
  - Utilize wet weather monitoring results for development of wet weather standards.
  - Assist in standard setting for Armand and Buffalo Bayous.
  - Review and comment on proposed standard revisions

  Proper Enforcement
  - 208 plan assumes that point source discharges will meet their permit requirements at the projected flow volumes. This will require effective enforcement and coordination in enforcement actions.

- PLANNING

  Top Priority - to be implemented during first year.
  - Establish Water Quality Council including presentation of work program, familiarization with plan.
  - Mesh designated and non-designated methods.
  - Initiate mechanisms for ongoing efforts, for example, population/land use update.
  - Continue public participation program with emphasis on nonpoint source awareness.
  - Selection of test areas for nonpoint source studies.

Ongoing Activities - to be initiated in the first year and continued thereafter.

- A-95 review activities including facility plans, EIS for developments.
- Monitor and update population growth and distribution.
- Update inventories and projections.
- Interface with WQC and other management agencies.
- Coordination with other planning disciplines.
- Evaluation of applicability of technical subplans and regionalization opportunities.
- Review of nonpoint source control needs.
- Review and coordinate special programs.
- Conduct special studies (see page 26).

Conduct Public Participation Program.

- Public information brochures, workshops, newsletters.
- Water awareness activities.
- Dissemination of plan update information.
- Maintenance and expansion of mailing lists.
- Sponsor and participate in citizen group activities.
- Conduct public hearings as appropriate.
- Update citizen goals and objectives.

Estimated Budget and Staff Requirements (first year).

- Staff: equivalent of five (5) professionals (Administrator, Engineer, Planner, Environmental Scientist, Public Participation Planner). One (1) Staff Assistant (Engineering Technician). One (1) Secretary.

Estimated Budget

- $300,000 excluding special studies, anticipate 75% federal funding, remainder to be provided from local sources and possible State assistance.

● NONPOINT SOURCE CONTROL

Problem areas identified include:

- Cypress Creek, benthal loads; Clear Creek, urban runoff; Houston Ship Channel, urban runoff.
- See special studies, page 26, and nonpoint source management program, page 18.
- Authorities exist at the Federal, State, and local level to control nonpoint sources of pollution, particularly with regard to dual purpose programs, that is, erosion control, "anti-litter", flood control. The 208 program proposes emphasizing use of these existing authorities and best management practices to assist in the control of pollution from nonpoint sources. An extensive effort to educate public officials and the community concerning the benefits of nonpoint source pollution control may be required.

● MANAGEMENT/COORDINATION

As previously stated, this function is to be met by the formation of a WQC. For further detail of the activities and composition of this body see page 19.

● WASTEWATER TREATMENT: ANTICIPATED FACILITY CONSTRUCTION NEEDS

Segment	1978 - 1983			1984 - 1990			1991 - 1995		
	New Plants	Plant Expansion	Total New Capacity MGD	New Plants	Plant Expansion	Total New Capacity MGD	New Plants	Plant Expansion	Total New Capacity MGD
Spring Creek	11	2	7.73	1	1	.29	1	1	1.30
Cypress Creek	10	3	2.42	3	-	.45	4	-	.40
Lake Houston	1	1	2.25	-	2	.42	-	-	-
Clear Creek Non Tidal	2	-	1.40	-	3	1.40	-	1	.05
Clear Creek Tidal	-	2	3.40	-	-	-	-	1	3.25
Clear Lake	-	-	-	-	-	-	-	-	-
Armand Bayou	-	-	-	-	-	-	-	-	-
Dickinson Bayou	-	-	-	-	-	-	-	-	-
Houston Ship Channel	1	1	1.80	-	3	2.00	-	-	-
San Jacinto River	-	2	.17	-	-	-	-	-	-
White Oak Bayou	-	3	4.40	-	1	6.00	-	-	-
Buffalo Bayou	7	6	110.00	-	1	.16	-	-	-
Braes Bayou	6	5	24.1	-	-	-	-	3	1.80
Sims Bayou	1	5	18.8	-	1	20.0	-	-	-
Vince Bayou	-	-	-	-	-	-	-	-	-
Hunting Bayou	-	1	2.1	-	-	-	-	-	-
Carpenter Bayou	1	-	0.2	-	-	-	-	-	-
Greens-Halls Bayou	2	3	10.2	-	-	-	-	2	0.46

COST OF CONSTRUCTION FOR SEWAGE TREATMENT PLANTS BY SUBBASIN *

	1978 - 1983	1984 - 1990	1991 - 1995
Lake Houston	$34,860,000	$ 4,620,000	$ 3,100,000
Clear Lake	17,400,000	7,500,000	5,000,000
Houston Ship Channel	261,300,000	17,180,000	7,840,000

* Includes new plants, expansions, and upgrading of facilities to meet permit requirements according to selected plan. Costs are based on 1975 dollars with no inflation factors.

FINANCING TOOLS BY PROPOSED ACTIONS

Potential Financing Tools	Proposed Actions: Create New Service Area	Expand Existing Plant Facilities	Upgrade Existing Treatment	Develop Major Conveyances	Develop Minor Conveyances
EPA 201 Grants	●	●	●	●	
EDA Grants	●				●
Community Development Block Grants					●
FmHA Grants and Loans	●				●
Texas Water Quality Enhancement Loans	●	●	●	●	
General Obligation Bonds	●	●	●	●	●
Revenue Bonds	●	●	●	●	●
Certificates of Obligation	●	●	●	●	●
Special Assessment Bonds					●
Ad Valorem Taxes	●	●	●	●	●
User Charges	●	●	●	●	●
Connection Charges	●				●

H-GAC AREAWIDE
208 AREAWIDE WATER
QUALITY MANAGEMENT PLAN
CONTINUING PLANNING AND SPECIAL PROGRAMS

Program	Location	Emphasis and Application	Priority[1]	Prime Responsibility
Update Steady-State water quality simulation models	Spring Creek	Nitrification in Creek to Determine Need of NH_3-N Effluent Requirement	B	TDWR
	Cypress Creek	Magnitude and source of Benthal Oxygen demand. Feasibility of meeting existing stream standards.	B	TDWR
	Clear Creek	General (i.e. degradation and rate constants and other parameters)	B	TDWR
	San Jacinto	Effects of Houston Ship Channel. Development of Benthic loads	E	TDWR
	Armand Bayou	Develop Model	E	TDWR
	Dickinson Bayou	Extend model to nontidal portion. Emphasize ammonia effects	E	TDWR
	Ship Channel	Extend model to major tributaries. Re-verify based on existing conditions. Emphasize Benthal Oxygen Demand	E	TDWR
Wet weather water quality monitoring	Spring, Cypress San Jacinto	Verify prediction of existing modeling simulation (i.e. no wet weather problems)	E	WQC[2]/TDWR
	Clear Creek	Monitor wet weather water quality as first step of model verification	A	WQC/TDWR
	Ship Channel	Determine feasibility of meeting fishable/ swimmable during wet weather	B	WQC/TDWR
	Armand Buffalo	Develop data base prior to classification	D	TDWR
Update nonsteady-state water quality simulation models	Spring, Cypress, San Jacinto, Armand, Buffalo	Possible action items based on wet weather water quality monitoring results	E	TDWR
	Clear Creek	Verify model and wasteload inputs. Quantify target reduction to detail control strategies	A	TDWR/WQC
	Ship Channel	If monitoring indicates fishable/swimmable may be achieved, verify model and wasteload inputs. Quantify target reduction to detail control strategies	E	TDWR/WQC
Wet weather standards evaluation	All Classified	Determine parameters and numerical values consistent with water uses on which dry weather standards are based	A	WQC/TDWR
Dry weather standards evaluation	Armand	Determine water quality standards as part of classification process	D	TDWR

CONTINUING PLANNING AND SPECIAL PROGRAMS

Program	Location	Emphasis and Application	Priority	Prime Responsibility
	Buffalo	Determine water quality standards consistent with noncontact recreation and preservation of bayou aesthetics	D	WQC/TDWR
	Ship Channel	Evaluate alternate water quality standards and uses based on results of wet weather programs	E	WQC/TDWR
Update point source inventory	All	Maintain accurate and up-to-date data base to assist in future planning efforts	E	HGAC
Update population and land use	All	Maintain accurate updated data base. Emphasis on computerization so alternate data sources can be easily evaluated and integrated. Application: to re-evaluate allocations, nonpoint source wasteloads, predict problem areas, identify deviation from existing data base and projections to focus future planning efforts	C	HGAC
Update nonpoint source wasteload	All	Emphasize dry weather contribution. Incorporate into existing steady state models where applicable	E	HGAC
Eutrophication	Lake Houston	Verify plan recommendations	E	City of Houston
	Clear Lake	Emphasize total phosphorus loading including sources. Determine effects of alternate phosphorus loadings on eutrophication. Application: to determine cost effectiveness of existing point source phosphorus controls	A	TDWR
Ongoing planning for Regionalization Opportunities	All	Emphasize utilization of 201 Programs to evaluate regionalization. Evaluate Facility Planning Areas during pre-grant application phase	C	HGAC/WQC/201 grantees
Evaluate Supplemental aeration	Ship Channel	Determine effect and cost-effectiveness on Ship Channel dissolved oxygen levels. Application: alternate method of achieving water quality standards	E	GCWDA
Inter-basin transport evaluation	Clear Creek	Determine cost effectiveness, acceptability and environmental impact of transporting wastewater out of Clear Creek watershed to alternate watersheds. Application: may assist in achieving stream standards in Clear Creek	B	201 grantees/WQC

CONTINUING PLANNING AND SPECIAL PROGRAMS

Program	Location	Emphasis and Application	Priority	Prime Responsibility
Determine impacts of additional water quality pollutants	All	Emphasize in stream levels of heavy metals and other toxic materials, as well as suspended solids during rainfall events. Application: focus on-going planning	E	TDWR/WQC
Analyze nonpoint source controls	Clear Creek	Select test areas to evaluate impact of nonpoint source controls on wet weather pollutant loadings. Application: develop detailed technical subplans	A	HGAC/WQC
Evaluate desirability of classification of bayous	Ship Channel	Emphasize water uses and cost effectiveness	E	HGAC/WQC
Evaluate non-water quality impacts of nonpoint source	All	Emphasize erosion and flood control, as well as transportation air quality and other environmental programs. Application: Interface with all environmental programs, as required by 208.	E	HGAC/WQC
Coordinate designated and non-designated area plans	All	Evaluate both plans and endeavor to coordinate them and their implementation devices.	C	HGAC/WQC
Nonpoint ordinance Analysis	All	Collect and analyze all nonpoint controls now in effect in order to develop a refined nonpoint program.	D	HGAC/WQC
Map all water districts	All	Inventory and map all existing water districts and service areas.	E	HGAC
Environmental planning interface	All	Coordinate 208 plans and implementations with other environmental programs including air quality, transportation, solid waste, 201 and 303, and CZM.	D	HGAC/WQC

Notes:

1. A-Highest Priority - Irreversible commitments and negative environmental affects without data (Initiate immediately)

   B-Plan decisions affecting major resource allocation dependent upon results (Initiate as priority A commitments allow)

   C-Continual/on-going effort (Initiate mechanisms, intensity in future)

   D-Required as part of plan implementaton but not critical (Initiate after A and B)

   E-Necessary to plan update (Initiate in time for plan update)

2. Water Quality Council (WQC) implies coordination of local entity.

IMPACT ASSESSMENT

The National Environmental Policy Act (NEPA) requires that environmental consideration be included in decision making processes concerning Federal projects and activities. In order to incorporate these considerations, it is necessary to develop a complete understanding of the possible and probable consequences of a proposed action on the environment.

The concept of "environment" includes many aspects of resources both natural such as air, water, plants, and animals and man-made such as transportation systems, land use characteristics, community structure, and economic stability. Both the physical and social/economic elements of the environment must be considered in impact assessment.

The 208 plan is based on accommodation of growth that is projected to occur over the 20-year planning period. In most cases, therefore, the impacts that are predominant are those resulting from the growth and changing land use patterns and not from plans for waste treatment management.

The environmental impact assessment for the Greater Houston 208 plan highlights areas of particular concern as well as potential adverse and/or beneficial results to be expected from plan implementation. The following paragraphs summarize the results of an independent look at the 208 plan recommendations, and the impact(s) they will have on point and nonpoint source controls, biological resources, air quality, public health, economics and attaining the goal of fishable/swimmable water quality for the Greater Houston area. Copies of the complete report can be found at the depositories listed on page 31.

WATER QUALITY

The environmental assessment of the recommended 208 plan as it affects water quality is a key issue. The 'goal' of fishable/swimmable water quality is used as the yardstick to measure the effects of the proposed plan. Achievement of the 'goal' is the norm from which recommendations are measured. Those recommendations which do not result in meeting the prescribed 'goal' are considered to have a negative impact. A positive impact would be a condition better than fishable/swimmable.

In all cases, water quality models were used to evaluate the changes in water quality conditions that would occur as a result of the plan recommendations. However, some of these water quality models are uncalibrated and unverified. This means that the results of the modeling studies cannot be used with a high level of confidence to predict the changes that may actually occur when the recommendations are enacted.

Areas where achievement of the fishable/swimmable condition is predicted (assuming proper enforcement and subject to the limitations of stream models) are:

Lake Houston (1002)
Spring Creek (1008)
San Jacinto River (1001)
HSC-Morgan's Point to San Jacinto River (1005)
Tabbs Bay (2426)
San Jacinto Bay (2427)
Black Duck Bay (2428)

Scott Bay (2429)
Burnett Bay (2430)
Clear Creek Tidal (1101)
Clear Lake (2425)

The following segments are predicted to fall short of fishable/swimmable:

Cypress Creek (1009)
HSC to Turning Basin (1006 & 1007)
Clear Creek Nontidal (1102)
Dickinson Bayou Tidal (1103)
Dickinson Bayou Nontidal (1104)

The 208 plan provides a beneficial impact in several ways. Data collection activities will result in the accurate definition of existing nonpoint source wasteloads and their impacts on water quality as well as providing for verification of wet-weather models to predict future conditions. Area specific, nonpoint source data (particularly urban runoff) are practically non-existent and preventive measures have received little attention. Without the 208 plan this situation will most likely carry into the future. The proposed management system will encourage the initiation of nonpoint source programs. This system will also provide for more local input into point source regulations by review of permit applications, recommending enforcement actions and providing a vehicle for watershed coordination.

BIOLOGY

The recommended 208 plan will produce only minor impacts on the biological resources of the 208 area. Some thirty natural areas have been located and described as to the type of wildlife inhabitants (including endangered species) and vegetative characteristics. Impact assessment is difficult at best when applied to an areawide plan that is not site specific. Whether the 208 plan is implemented or not, 201 facility planning and construction activities will continue and these activities are site specific and will affect the maintenance or removal of natural areas. At such time as site specific activities are proposed, more detailed evaluation will take place.

AIR

The assessment of air quality has resulted in a data base which indicates what locations throughout the 208 area are affected by poor air quality. The Lake Houston Subbasin appears to be the least affected area while the Houston Ship Channel and Clear Lake Subbasins are more severely affected. Of particular note is the Federal emission offset policy which may impact industrial development in the Houston Ship Channel area. However, the 208 plan will not directly affect air quality.

PUBLIC HEALTH

With respect to public health in the Greater Houston 208 area, implementation of the preferred plan will maintain a safe fishable/swimmable level of fecal coliform bacteria relating to water borne diseases. However, the only human health parameter which has been addressed in the technical analysis is fecal coliform while other potentially harmful substances (heavy metals, toxins, chlorinated hydrocarbons and viruses) in area waters, received slight, if any, attention. It is suggested, therefore that further study be carried out to determine the presence of such substances and develop measures to alleviate the associated potential problems.

ECONOMICS

Economic variables such as income, employment and land value will generally not be affected by implementing the 208 plan. The major costs involved in meeting the goal of fishable/swimmable streams will be those needed to meet current permit restrictions and providing wastewater treatment service to new growth areas. Only in the Cypress Creek and Clear Creek Nontidal is the possibility of upgrading treatment facilities recommended. At the same time implementation of recommended regionalization may offset the cost of upgrading facilities.

GOALS AND OBJECTIVES

The Citizens Advisory Group adopted a set of goals and objectives for the 208 plan early in the planning process. The plan recommendations being presented address these goals and objectives in a generally positive way. In particular, recognition has been given to the concept of watershed management; the importance of further consideration of nonpoint sources and their abatement has been stressed; public information and its dissemination has been given a high priority; and a Houston Area Water Quality Council to coordinate management efforts has been proposed.

PUBLIC PARTICIPATION SUMMARY

An important aspect of 208 program development and execution is the active solicitation of public involvement. The plan, as presented, has received extensive review by Advisory Committees. The Areawide Planning Advisory Committee (APAC), a group appointed by the Governor, reviews and comments on all planning policies and plan outputs. The Technical Advisory Committee (TAC) was appointed by the H-GAC Executive Committee and charged with the technical analysis of 208 planning elements. The Citizens Advisory Group (CAG) is an open membership group serving as a forum for public review and a means of communication between the lay citizen and the technical planners. (A list of 208 program participants can be found on page 34).

Throughout the process, attempts were made to inform the general public of the program and study findings, and to solicit input through the use of the news media, special mailings, public workshops and hearings. The following is a summary of major public participation activities from September, 1975 through March, 1978.

	Number
Advisory Committee Meetings	
Areawide Planning Advisory Committee	28
Technical Advisory Committee	69
Citizens Advisory Group	63
Presentations	
General Presentations	35
League of Women Voters' Slide Show "Tomorrows Water"	46
Presentations to H-GAC Executive Committee	6
Press Releases	9
Newspaper and Magazine Articles	67

Alvin Sun
Bayshore Sun
Baytown Sun
Clear Lake Citizen
Conroe Courier
Deer Park Progress
Galveston Daily News
Galveston News
Houston Chronicle
Houston Post
Humble Echo
Journal of Water Pollution Control Federation
Citizens Environmental Coalition Newsletter
H-GAC Spectrum
News & Views
North Suburbia Report
Pasadena Citizen
Sun-Progress
Texas City Sun
The Angleton Times
The Times
The Woodlands Sun
Westside Reporter

Radio Programs	13
KEYH; KPFT; KXYZ; KAUM; KTRH	
Television Coverage	6
Channels 8, 26, 2, 13	

Special Events:

Field Trips with Citizens Advisory Group	6
Northside Sewage Treatment Plant	
CAG/Soil Conservation Service (2)	
Woodlands Sewage Treatment Plant	
Shell Complex Tour	
NASA Automated Water Monitor System (at Southeast Sewage Treatment Plant)	
Izaak Walton Leagues' Water Wagon at:	
Allen's Landing Park	
Spring Creek Park	
Galveston County Park	
Sylvan Beach	
Booth at Jacques Cousteau Involvement Day	
Participation in Conferences/Seminars	
Water Pollution Control Federation	
American Institute of Planners	
American Society of Planning Officials	
Association of Metropolitan Sewerage Agencies	
League of Women Voters Symposium	
EPA/UT Dallas Workshops	
Small Cities Seminars (UH/H-GAC)	
Newsletters and Brochures	8
Public Workshops	
Water Quality General	
Citizen Goals and Objectives	
Population/Land Use	
Stream Standards	
Summary Report Conferences	
Mailing Lists (No. of Names)	
September, 1975	350
March, 1978	2,203
Public Hearings	5

PROGRAM PARTICIPANTS

EXECUTIVE COMMITTEE OF THE HOUSTON-GALVESTON AREA COUNCIL (1978)

The Honorable Benjamin Babovec
The Honorable Tom Bass
The Honorable Otha Birkner
The Honorable J. H. Brigance
The Honorable Dee E. Brune
The Honorable Dan Cox
The Honorable Lester J. Cranek
The Honorable Ralph Davis
The Honorable R.A. "Mickey" Deison
The Honorable Charles T. Doyle
The Honorable John Drozd
The Honorable Homer Ford
The Honorable Harlan Friend
The Honorable J. R. Harrison
The Honorable Ray Holbrook
The Honorable Benny Howard
The Honorable Jon Lindsay
The Honorable Jim McConn
The Honorable Floyd Myers
The Honorable Lee Mendenhall
The Honorable Ray Morrison
The Honorable Johnnie Pustka
The Honorable Tom Reid
The Honorable Jack Taylor
The Honorable Everett Tomlinson
The Honorable Mary Wilbanks
The Honorable John Unbehagan

AREAWIDE PLANNING ADVISORY COMMITTEE FOR THE GREATER HOUSTON 208 PROGRAM

Mr. E. B. Cape (Chairman)-deceased
Mr. Joe P. Teller (Vice-Chairman)
Mr. Jack Ayer
Mr. Malcolm D. Bailey
Mr. Don Betterton
Mr. Jimmie D. Coker
Mr. William E. Colbert
The Honorable Dan Cox
Mr. James B. Dannenbaum
Mr. Mel Davis
Mr. John H. Garrett
Mr. W. S. Gibbs
Mr. Billy G. Goff
Mr. Ed Griffith
Mr. F. E. Guthrie
The Honorable J. R. Harrison
Mrs. Terry Hershey
Mr. Don Hicks
Mr. C. E. Ince, Jr.
Mr. Ivan Langford, III
Mr. Richard A. Lewis
Mr. Harold Loyd
Mr. Thomas G. Mabray
Mr. Marty J. Manning
Mr. Robert M. Moore
Mr. Lind Nelson
Mr. Jimmy Petrick
Mr. Omer Poorman
Mr. Enrique Quevedo
Mr. Philip B. Scheps
Mr. Gordon Smith
Mr. R. Wayne Smith
Mr. Dan B. Stauffer
Mr. John Watts
Mr. Robert W. Williams
Mr. William G. Wooley
Mr. William W. Wright

TECHNICAL ADVISORY COMMITTEE FOR THE GREATER HOUSTON 208 PROGRAM

Mr. Joe P. Teller (Chairman)
Mr. William W. Wright (Vice-Chairman)
Dr. Philip B. Bedient
Mr. Clark Benson
Mr. Jimmie D. Coker
Mr. Dennis Crowley
Mr. Mike McEnany
Mr. Marty Manning
Dr. Jack V. Matson
Mr. Lind Nelson
Mr. Enrique Quevedo
Mr. James Green

CITIZENS ADVISORY GROUP

Mr. Ray Runnels (Chairman)
Mr. Bruce Thomson (Vice-Chairman)

208 PLAN REPORTS GREATER HOUSTON AREA

Project Design Report, January, 1976.

Population and Land Use, Interim Report, April, 1976.

Solid Waste Site Survey & Report, August, 1976.

Goals and Objectives Report, September, 1976.

Sludge and Residual Waste Inventory, October, 1976.

Subsidence and Related Effects on Wastewater Collection and Treatment Facilities, November, 1976.

"How Clean Do You Want Your Streams?" - A Prospectus of Current Planning In Water Pollution Control For The Greater Houston Section 208 Area, December, 1976. Revised, May, 1977.

Water Quality Models, May, 1977.

Assessment of Nonpoint Sources and Map Supplement, July, 1977.

Control Strategies, Costs & Impacts for Nonpoint Sources, July, 1977.

Nonpoint Source Sampling Design Report, July, 1977.

Point Source Analysis Inventory, Water Demands & Problem Area Identification and Map Supplement, July, 1977.

Control Strategies, Costs & Impacts For Point Sources, July, 1977.

Management Assessment, July, 1977.

Non-Structural Control Strategies for Nonpoint Sources of Water Pollution - Supplemental Report, September, 1977.

Current Wastewater Management, May, 1977, Revised November, 1977.

Broad Management Options, July, 1977, Revised November, 1977.

Alternative Management Systems, November, 1977.

Alternative Technical Subplans, and Map Supplement, December, 1977.

Population and Land Use, December, 1977.

Summary Report, Areawide Waste Treatment Management Plan For the Greater Houston Area, December, 1977.

Impact Assessment Report, March, 1978.

Public Participation Summary, March, 1978.

Areawide Waste Treatment Management Plan Summary, March, 1978.

Implementation Requirements Report, April, 1978.

SECTION 208 PLAN REQUIREMENTS AND RELATED OUTPUTS OF GREATER HOUSTON 208 PROGRAM

Plan Element Requirement (40 CFR 131.11)	Reference Document
(a) Planning Boundaries	
(1) Approved State planning areas.[1]	"Proposed Designation of an Area and Agency for Waste Treatment Management Planning". March, 1975, Texas Water Quality Board.
(2) Areas in which facility planning has been deemed necessary.	"Municipal Facilities Construction Priority List", Texas Water Quality Board. "Alternative Technical Subplans" December, 1977.
(3) Location of each water quality and effluent limited segment.	"State of Texas Water Quality Management Program" FY 1978. "Areawide Waste Treatment Management Plan Summary", March, 1978.
(4) Location of Significant discharges.	"Water Quality Models" May, 1977. "Point Source Analysis Inventory, Water Demands and Problem Area Identification", July, 1977. "Alternative Technical Subplans", December, 1977.
(5) Location of fixed monitoring stations.	"Waste Load Allocations", Texas Water Quality Board. "How Clean Do You Want Your Streams", May, 1977. "Water Quality Models", May, 1977. "Nonpoint Source Sampling Design Report" July, 1977. Unpublished Maps and Water Data Base (H-GAC).
(b) Water Quality Assessment and Segment Classifications	
(1) Assessment of existing problems.	"Assessment of Nonpoint Sources", July, 1977. "Point Sources Analysis Inventory, Water Demands and Problem Area Identification", July, 1977. "Alternatives Technical Subplans" December, 1977. "Impact Assessment", March, 1978.
(2) Segment Classification	"State of Texas Water Quality Management Program", FY 1978. "Point Source Analysis Inventory, Water Demands and Problem Area Identification", July, 1977. "Areawide Waste Treatment Management Plan Summary", March, 1978.
(c) Inventories and Projections	
(1) Inventory and ranking of Municipal Sources.[2] Inventory of "significant industrial discharges".[3]	"Point Source Analysis Inventory, Water Demands and Problem Area Identification", July, 1977.
(2) Existing land use patterns.	"Population and Land Use", July, 1976.
(3) Demographic and Economic projections	"Economic Base Analysis of the Gulf Coast State Planning Region", December, 1974. "Population and Land Use", July, 1976. "Impact Assessment", March, 1978.

(4) Projected municipal and industrial wasteloads.	Municipal Wasteload projections in computer print-out form (H-GAC). "Point Source Analysis Inventory, Water Demands and Problem Area Identification", July, 1977. "Alternative Technical Subplans", December, 1977.
(5) Projected land use patterns.	"Population and Land Use", July, 1976. "Impact Assessment", December, 1977.
(d) Nonpoint Source Assessment.	"Assessment of Nonpoint Sources", July, 1977. "Alternative Technical Subplans", December, 1977.
(e) Water Quality Standards.	"Texas Water Quality Standards", February, 1976. "How Clean Do You Want Your Streams", May, 1977. "Alternative Technical Subplans", December, 1977. "Implementation Requirements", April, 1978.
(f) Total Maximum Daily Loads[4]	"Waste Load Allocations" Texas Water Quality Board "Point Source Analysis Inventory,Water Demands and Problem Area Identification", July, 1977. "Water Quality Models", May, 1977. "Alternative Technical Subplans", December, 1977.
(g) Point Source Load Allocations.	"Waste Load Allocations" Texas Water Quality Board. "Point Source Analysis Inventory, Water Demands & Problem Area Identification",July,1977. "Water Quality Models", May, 1977. "Alternative Technical Subplans", December, 1977. "Summary Report, Areawide Waste Treatment Management Plan for the Greater Houston Area", December, 1977.
(h) Municipal Waste Treatment System Needs.	"Alternative Technical Subplans", December, 1977. "Implementation Requirements", April, 1978.
(i) Industrial Waste Treatment Systems[5]	
(j) Nonpoint Source Control Needs.	"Assessment of Nonpoint Sources", July, 1977. "Control Strategies, Costs and Impacts for Nonpoint Sources", July, 1977. "Alternative Technical Subplans", December, 1977. "Summary Report, Areawide Waste Treatment Management Plan for the Greater Houston Area", December, 1977. "Implementation Requirements", April, 1978.
(k) Residual Waste Control Needs".[6]	"Solid Waste Site Survey", August, 1976. "Sludge and Residual Waste Inventory", October, 1976. "Assessment of Nonpoint Sources", July, 1977. "Alternative Technical Subplans", December, 1977.
(l) Urban and industrial stormwater	"Control Strategies, Costs and Impacts for Nonpoint Sources", July, 1977. "Assessment of Nonpoint Sources", July, 1977. "Alternative Technical Subplans", December, 1977. "Implementation Requirements", April, 1978.

(m) Target Abatement Dates.	"Implementation Requirements", April, 1978.
(n) Regulatory Programs	
(1) Description of existing regulatory programs.	"Management Assessment", July, 1977. "Current Wastewater Management", November, 1977.
(2) Description of necessary additional regulatory programs.	"Nonstructural Control Strategies for Non-point Sources of Water Pollution", September, 1977. "Alternative Management Systems", November, 1977. "Summary Report, Areawide Waste Treatment Management Plan For the Greater Houston Area", December, 1977. "Alternative Technical Subplans", December, 1977. "Implementation Requirements", April, 1978.
(o) Management Agencies.	"Alternative Management Systems", November, 1977. "Summary Report, Areawide Waste Treatment Management Plan For the Greater Houston Area", December, 1977. "Areawide Waste Treatment Management Plan Summary", March, 1978. "Implementation Requirements", April, 1978.
(p) Environmental, Social and Economic Impact.	"Impact Assessment", March, 1978.

[1] See "Summary Report", March, 1978 for plan recommendation on planning boundaries.

[2] Ranking provided through Texas Department of Water Resources computerized, self-reporting system.

[3] Also in unpublished support data (H-GAC)

[4] Requirement is satisfied by proposing effluent limitations.

[5] As related to wasteload reductions required to attain and maintain water quality standards.

[6] Reference State of Texas Solid Waste Program under Resource Conservation and Recovery Act.

LIST OF DEPOSITORIES FOR PROGRAM DOCUMENTS
GREATER HOUSTON AREA 208 PLANNING PROGRAM

Federal

U.S. Environmental Protection Agency, Region VI, Dallas, Texas
U.S. Army Corps of Engineers, Galveston District Office
U.S. Department of Agriculture, Soil Conservation Service, State Office, Temple, Texas
U.S. Department of the Interior, Southwest Region, Albuquerque, New Mexico

State

Texas Department of Water Resources, Austin, Texas
Texas Department of Water Resources Library, Austin, Texas
Texas State Soil and Water Conservation Board, Temple, Texas
Texas Department of Health, Austin, Texas
Texas State Library, Government Publications Section, Austin, Texas
Texas General Land Office, Planning Section, Austin, Texas

Regional

Houston-Galveston Area Council Library, Environmental Planning Division, Houston, Texas
Texas Department of Water Resources, District 7 Offices, Deer Park, Texas
Harris-Galveston Coastal Subsidence District, Houston, Texas
Gulf Coast Waste Disposal Authority, Houston, Texas
San Jacinto River Authority, Conroe, Texas
Clear Creek Basin Authority, Houston, Texas
Texas Department of Health, Region VII Office, Richmond, Texas
USDA Soil Conservation Service, Regional Office, Rosenberg, Texas
U.S. Fish & Wildlife Service, Galveston, Texas
*U.S. Environmental Protection Agency Library, Region VI, Dallas, Texas

County

Brazoria County Library System, Angleton, Texas
(serving branches in Angleton, Alvin, Clute, Freeport, Lake Jackson, Pearland, Sweeny, and West Columbia, Texas)
Galveston County Library System, Headquarters in Rosenberg, Texas
(serving branches in Dickinson, Friendswood, Hitchcock, La Marque, League City, and Rosenberg, Texas)
Harris County Library System, Houston, Texas
(serving branches in Houston, Channelview, Crosby, Galena Park, Highlands, Humble, Jacinto City, Katy, La Porte, South Houston, Tomball, and West University, Texas)
Fort Bend County Library System, Richmond, Texas
(serving branches in Richmond, Needville, and Stafford, Texas)
Montgomery County Library, Conroe, Texas
(serving New Caney Branch Library)
Waller County Library, Hempstead, Texas
(member, Houston Area Library System)
Galveston County Health Department, La Marque, Texas
Harris County Flood Control District, Houston, Texas
Harris County Pollution Control Department, Houston, Texas
Harris County Health Department, Houston, Texas

Specific

City of Houston, City Planning Department, Houston, Texas
City of Houston Public Works Department
City of Houston Health Department
City of Houston Policy Planning Division
City of Pasadena Public Library
City of Baytown, Sterling Municipal Library
Bellaire City Library
Rice University Library, Documents Department, Houston, Texas
University of Houston Library, Documents Department, Houston, Texas
University of Houston, Clear Lake City Library, Houston, Texas
Texas Southern University Library, Reference Department, Houston, Texas
Prairie View A & M University Library, Documents Department, Prairie View, Texas
North Harris County Community College Library, Houston, Texas
San Jacinto Junior College Library, Reference Department, Pasadena, Texas
University of Texas Health Science Center, Houston Texas
City of Houston Public Library
(serving 26 branches throughout the Greater Houston Area)
USDA Soil Conservation Service, Houston Office
Houston Audubon Society
Museum of Natural Science, Public Reading Room, Houston, Texas
League of Women Voters of Houston Office
Citizen's Environmental Coalition Office, Houston, Texas

*One copy to be included in the National Technical Information Services (NTIS) System

A RESOLUTION

RECOMMENDING TO THE EXECUTIVE COMMITTEE OF THE HOUSTON-GALVESTON AREA COUNCIL APPROVAL OF THE ALTERNATIVES AND INITIAL RECOMMENDATIONS PREPARED FOR THE AREAWIDE WASTE TREATMENT MANAGEMENT PLAN FOR THE GREATER HOUSTON AREA.

WHEREAS, the Houston-Galveston Area Council was designated on April 22, 1975 by the Governor of the State of Texas to prepare an Areawide Waste Treatment Management Plan for the Greater Houston Area under the provisions of Section 208 of the Federal Water Pollution Control Act Amendments of 1972;

WHEREAS, regulations called for the formation of an Areawide Planning Advisory Committee which was duly appointed by the Governor, for the purpose of advising his office as well as the planning agency throughout 208 program development;

WHEREAS, the Areawide Planning Advisory Committee is the focus of the public participation process and is charged with review and comment on all plan outputs.

WHEREAS, the Areawide Planning Advisory Committee has met regularly to fulfill these duties as charged;

WHEREAS, public participation efforts of the Areawide Planning Advisory Committee have been further supplemented by the Houston-Galveston Area Council by operating an open process to gain inputs from the public throughout program development;

WHEREAS, alternatives and recommendations for meeting both technical and management requirements of Section 208 were prepared by the Houston-Galveston Area Council and presented in a publication entitled, "Summary Report, Areawide Waste Treatment Management Plan for the Greater Houston Area, December, 1977";

WHEREAS, all supporting documents were routinely reviewed by the Areawide Planning Advisory Committee and were made available to all interested participants;

WHEREAS, public hearings were held on February 7, 8, and 9, 1978 concerning the alternatives and recommendations, in full accordance with Federal and State laws and regulations, and;

WHEREAS, the public hearings resulted in testimony generally supportive of the planning process and the alternatives/recommendations presented;

NOW, THEREFORE BE IT RESOLVED BY THE HOUSTON AREAWIDE PLANNING ADVISORY COMMITTEE:

Section 1 THAT, to date, the planning process has been duly served in developing alternatives and recommendations for meeting Houston Area 208 program requirements.

Section 2 THAT, a favorable recommendation be made by the APAC to the Houston-Galveston Area Council Executive Committee concerning submittal of the Alternative Technical Subplans Report, the Alternative Management Systems Report and the Summary Report of Alternatives/Recommendations along with the Public Record to the Texas Department of Water Resources for the purpose of fulfilling required State certification procedures.

Section 3 THAT, the final plan to be submitted to the State prior to April 22, 1978, include consideration of the following points:

(a) A clear statement that technical recommendations are subject to change as data are refined and verified.

(b) The understanding that where specific methods of achieving stream standards are recommended, alternate methods of achieving the desired results will be acceptable.

(c) A recommendation to the Texas Department of Water Resources that Armand Bayou be classified as a stream segment.

(d) During the plan update phase, the desirability of classifying other area streams and bayous will continue to be evaluated.

(e) The Texas Department of Water Resources immediately initiate a study leading to review of phosphorous removal requirements for Clear Lake, Clear Creek, and Dickinson Bayou (tidal) in light of 208 technical findings.

(f) Plan implementation should provide for further study of heavy metals, chlorinated hydrocarbons and other toxic materials.

(g) Assignment of high priority to updating population and land use estimates and projections.

(h) Recommendation to expand the designated 208 planning area to include the entirety of the San Jacinto Watershed within the Houston-Galveston Area Council's planning jurisdiction.

Section 4 THAT, a task force be appointed to outline the specifics of the Water Quality Council with a timetable for completion. In the interim, the public participation program will be continued along with coordination activities of the Texas Department of Water Resources and involvement by the Houston Areawide Planning Advisory Committee.

PASSED AND APPROVED THIS 16th day of February, 1978, at a special meeting of the Houston Areawide Planning Advisory Committee.

APPROVED:

Joe P. Teller

Joe P. Teller, Vice-Chairman
Houston Areawide Planning Advisory Committee

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HOUSTON-GALVESTON AREA COUNCIL